

## WHAT IS CLAIMED IS:

1. A method for facilitating reconstruction of an image, said method comprising:

estimating a gradient for at least one high-density object;

generating a gradient image using the estimated gradient; and

generating an error-candidate projection using the gradient image.

2. A method in accordance with Claim 1 wherein to generate an error-candidate projection, said method further comprises forward projecting the gradient along  $\beta$  wherein  $\beta$  represents a projection view angle.

3. A method in accordance with Claim 2 further comprising scaling the error-candidate projection with an error fraction based upon the  $\beta$ .

4. A method in accordance with Claim 3 further comprising scaling the error-candidate projection with an error fraction  $c_\beta$  such that

$c_\beta = z - \text{int}(z)$ , where  $z = \frac{(\beta - \beta_c)p}{2\pi} + \frac{M+1}{2}$ , wherein  $\beta_c$  represents a center view angle,  $p$  is the pitch,  $\text{int}(z)$  represents the integer portion of  $z$ , and  $M$  represents the number of rows in a detector array.

5. A method in accordance with Claim 2 further comprising reconstructing an error image using the error-candidate projection.

6. A method in accordance with Claim 5 further comprising generating a final image by scaling the error image and subtracting the scaled error image from an original image.

7. A method in accordance with Claim 1 wherein estimating a gradient for a high-density object comprises estimating a gradient for a high-density object such that  $g(i, j) = d_-(i, j) + d_+(i, j) - 2d(i, j)$ , where  $g(i, j)$  represents the

gradient estimate for the  $(i,j)$  pixel and  $d_-(i,j)$ ,  $d_+(i,j)$ , and  $d(i,j)$  are determined according to:

$$d_-(i,j) = \begin{cases} f_-(i,j) - h, & f_-(i,j) \geq h \\ 0 & \text{otherwise} \end{cases}$$

$$d(i,j) = \begin{cases} f(i,j) - h, & f(i,j) \geq h \\ 0 & \text{otherwise} \end{cases}$$

$$d_+(i,j) = \begin{cases} f_+(i,j) - h, & f_+(i,j) \geq h \\ 0 & \text{otherwise} \end{cases}$$

where  $f$ ,  $f_-$ , and  $f_+$  represent three images separated by a spacing  $s$  with  $f$  being between  $f_-$  and  $f_+$ , and  $h$  is a pre-determined threshold value.

8. A method in accordance with Claim 2 further comprising helically weighting the error candidate image.

9. A method in accordance with Claim 2 wherein said forward projecting the gradient along  $\beta$  comprises performing at least one of a fan beam forward projection and a parallel beam forward projection.

10. A method in accordance with Claim 1 further comprising producing different gradient images using a segmentation technique.

11. A method in accordance with Claim 10 wherein said producing different gradient images using a segmentation technique comprises:

separating at least two different classes of objects including a first class and a second class;

using a first contrast threshold value for the first class; and

using a second contrast threshold value different from the first contrast threshold value for the second class.

12. A method in accordance with Claim 7 further comprising using more than three adjacent images to produce a gradient image.

13. A computer programmed to:

estimate a gradient for at least one high-density object;

generate a gradient image using the estimated gradient; and

generate an error-candidate projection using the gradient image.

14. A computer in accordance with Claim 13 further programmed to forward project the gradient along  $\beta$  wherein  $\beta$  represents a projection view angle.

15. A computer in accordance with Claim 14 further programmed to scale the error-candidate projection with an error fraction based upon the  $\beta$ .

16. A computer in accordance with Claim 15 further programmed to scale the error-candidate projection with an error fraction  $c_\beta$  such that  $c_\beta = z - \text{int}(z)$ , where  $z = \frac{(\beta - \beta_c)p}{2\pi} + \frac{M+1}{2}$ , wherein  $\beta_c$  represents a center view angle,  $p$  is the pitch,  $\text{int}(z)$  represents the integer portion of  $z$ , and  $M$  represents the number of rows in a detector array.

17. A computer in accordance with Claim 15 further programmed to reconstruct an error image using the error-candidate projection.

18. A computer in accordance with Claim 17 further programmed to generate a final image by scaling the error image and subtracting the scaled error image from an original image.

19. A computer in accordance with Claim 17 further programmed to perform at least one of a fan beam forward projection and a parallel beam forward projection.

20. A computer in accordance with Claim 14 further programmed to estimate a gradient for a high-density object such that  $g(i, j) = d_-(i, j) + d_+(i, j) - 2d(i, j)$ , where  $g(i, j)$  represents the gradient estimate for the (i,j) pixel and  $d_-(i, j)$ ,  $d_+(i, j)$ , and  $d(i, j)$  are determined according to:

$$d_-(i, j) = \begin{cases} f_-(i, j) - h, & f_-(i, j) \geq h \\ 0 & \text{otherwise} \end{cases}$$

$$d(i, j) = \begin{cases} f(i, j) - h, & f(i, j) \geq h \\ 0 & \text{otherwise} \end{cases}$$

$$d_+(i, j) = \begin{cases} f_+(i, j) - h, & f_+(i, j) \geq h \\ 0 & \text{otherwise} \end{cases}$$

where  $f$ ,  $f_-$ , and  $f_+$  represent three images separated by a spacing  $s$  with  $f$  being between  $f_-$  and  $f_+$ , and  $h$  is a pre-determined threshold value.

21. A computer in accordance with Claim 14 further programmed to:

separate at least two different classes of objects including a first class and a second class;

use a first contrast threshold value for the first class; and

use a second contrast threshold value different from the first contrast threshold value for the second class.

22. A computed tomographic (CT) imaging system for reconstructing an image of an object, said imaging system comprising:

a detector array;

at least one radiation source; and

a computer coupled to said detector array and said radiation source,  
said computer configured to:

estimate a gradient for at least one high-density object;

generate a gradient image using the estimated gradient; and

generate an error-candidate projection using the gradient image.

23. A CT imaging system in accordance with Claim 22 wherein said computer is further programmed to forward project the gradient along  $\beta$  wherein  $\beta$  represents a projection view angle.

24. A CT imaging system in accordance with Claim 23 wherein said computer is further programmed to scale the error-candidate projection with an error fraction based upon the  $\beta$ .

25. A CT imaging system in accordance with Claim 24 wherein said computer is further programmed to scale the error-candidate projection with an error fraction  $c_\beta$  such that  $c_\beta = z - \text{int}(z)$ , where  $z = \frac{(\beta - \beta_c)p}{2\pi} + \frac{M+1}{2}$ , wherein  $\beta_c$  represents a center view angle,  $p$  is the pitch,  $\text{int}(z)$  represents the integer portion of  $z$ , and  $M$  represents the number of rows in a detector array.

26. A CT imaging system in accordance with Claim 25 wherein said computer is further programmed to generate a final image by scaling the error image and subtracting the scaled error image from an original image.